



CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005



Job No.: CTCE/BBMP/W.No.07/BBU/WMM/Gradation/2016-17

: 28.11.2016



GRADATION FOR WMM MORTH TABLE-400-11

Client : Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.

Agency : Mr. B. B. Umesh,
#385/1, Near Anjaneya Temple, Bettahalsur Village & Post, Bangalore – 57.

Name of Work : Providing and filling of Pot holes in Ward No.07, Byatarayanapura, BBMP, Bangalore.

Reference : BBMP/EE/BTP/WO/89/2016-17 Dated: 05.08.2016

Date of Testing : 28.11.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): 5000

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	125	125	2.5	97.5	95-100
22.4	1650	1775	35.5	64.5	60-80
11.2	685	2460	49.2	50.8	40-60
4.75	600	3060	61.2	38.8	25-40
2.36	580	3640	72.8	27.2	15-30
0.600	650	4290	85.8	14.2	8-22
0.075	600	4890	97.8	2.2	0-8

Note:

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Date of Testing : 28.11.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	185	185	3.7	96.3	95-100
22.4	1490	1675	33.5	66.5	60-80
11.2	725	2400	48.0	52.0	40-60
4.75	680	3080	61.6	38.4	25-40
2.36	615	3695	73.9	26.1	15-30
0.600	500	4195	83.9	16.1	8-22
0.075	550	4745	94.9	5.1	0-8

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Job No.: CTCE/BBMP/W.No.07/BBU/WMM/AIV/2016-17

28.11.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. B. B. Umesh, #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore - 57.
Name of the Work	Providing and filling of Pot holes in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/89/2016-17 Dated: 05.08.2016
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	28.11.2016



Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	386	388	22.09
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	302	
4	Aggregate Impact value = percent fines	22.02	22.16	
	$100 * (W_2 / W_1) \%$			22.09

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.07/BBU/WMM/S-T/2016-17

28.11.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. B. B. Umesh, #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
Name of Work	Providing and filling of Pot holes in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/89/2016-17 Dated: 05.08.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	28.11.2016



Result : Flakiness Index = **11.59%**

Elongation Index = **13.23%**

Result : Combined Flakiness & Elongation index **24.82%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.07/BBU/BC/AIV/2016-17

16.12.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. B. B. Umesh, #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore - 57.
Name of the Work	Providing and filling of Pot holes in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/89/2016-17 Dated: 05.08.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	16.12.2016



Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	386	
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	84	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines	21.82	22.02	21.92
	$100 * (W_2 / W_1)$ percent			

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/W.No.07/BBU/BC/Shape.T/2016-17

: 16.12.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: Mr. B. B. Umesh, #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
Name of Work	: Providing and filling of Pot holes in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	: BBMP/EE/BTP/WO/89/2016-17 Dated: 05.08.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Bituminous Concrete
Date of Testing	: 16.12.2016



Result : Flakiness Index = **11.23%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **24.48%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.07/BBU/BC/Stripping/2016-17

16.12.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. B. B. Umesh, #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
Name of the Work	Providing and filling of Pot holes in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/89/2016-17 Dated: 05.08.2016
Type of Mix	Bituminous Concrete
Date of Testing	16.12.2016



Type of binder : 80/100
Percentage of binder used : 5.00% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.00 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.30	96.70
2	3.4		
3	3.3		

Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.09/BBU/BC/Sp_Wa/2016-17

16.12.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. B. B. Umesh, #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
Name of the Work	Providing and filling of Pot holes in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/89/2016-17 Dated: 05.08.2016
Type of Mix	Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	16.12.2016



Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2023	2024	2025	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1268	1269	1270	
4	Weight of saturated surface dry aggregate in air	W_3 g	2018	2019	2020	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_s)$ g	750	750	750	
6	Weight of oven dried aggregate	W_4 g	2003	2005	2006	
7	Specific Gravity	$W_4 / (W_3 - W_s)$	2.671	2.673	2.675	2.673
8	Apparent Specific gravity	$W_4 / (W_4 - W_s)$	2.725	2.724	2.726	2.725
9	Water Absorption	$((W_3 - W_4) * 100) / W_4$	0.75%	0.70%	0.70%	0.72%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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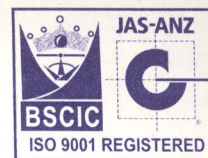


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Job No: CTCE/BBMP/W.No.07/BBU/BC/Bitumen/2016-17

16.12.2016

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

As per IS2386 and IRC:SP:11-1984

CLIENT	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	Mr. B. B. Umesh, #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore - 57.
NAME OF THE WORK	Providing and filling of Pot holes in Ward No.07, Byatarayanapura, BBMP, Bangalore.
REFERENCE	BBMP/EE/BTP/WO/89/2016-17 Dated: 05.08.2016
SAMPLE I/D	Pot hole filling to roads in Ward No.07.
DATE OF TESTING	16.12.2016



BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	470	469
3. Weight of Asphalt and Mineral matter Extracted, g	30	31
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	30	31
7. Bitumen content in %	6.00	6.20
8. Average	6.10	

GRADATION AFTER EXTRACTION

TABLE - 1

SIEVE SIZE	Percent Passing, %		JOBMIX
mm	Sample 1	Sample 2	Gradation
19	100.00	100.00	100
13.2	86.36	84.25	79-100
9.5	74.23	75.28	70-88
4.75	59.38	60.23	53-71
2.36	45.25	46.36	42-58
1.18	40.28	46.25	34-48
0.6	30.23	28.59	26-38
0.3	27.25	25.15	18-28
0.15	15.36	14.13	12-20
0.075	5.28	5.15	4-10

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